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PATENT ABSTRACTS OF JAPAN

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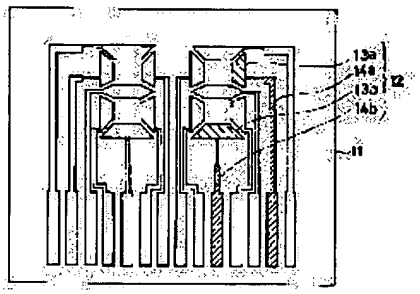
(54) ORGANIC ELECRO-LUMINENCE ELEMENT AND DRIVE METHOD THEREOF

(57)Abstract:
PROBLEM TO BE SOLVED: To eliminate discrepancy of light emission strength between pixel electrodes by setting to an almost constant value the product by multiplying the area of a pixel electrode by the resistance value of a power distribution electrode to be connected thereto.
SOLUTION: A transparent electrode 12 formed on a transparent board 11 is formed by separating a function into pixel electrodes 13a and 13b and power distribution electrodes 14a and 14b. And, an organic light emission layer is sequentially formed between the transparent electrode 12 and an opposite electrode to be opposite thereto to form a display element. The resistance value of the power distribution electrode is controlled by means of the shape of the electrode pattern so that the product by multiplying the areas of the pixel electrodes 13a and 13b by the resistance value of the power distribution electrodes 14a and 14b to be connected thereto is an almost constant value.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the structure and its drive method of an organic electroluminescence element.
[0002]
[Description of the Prior Art] There are an inorganic EL element and an organic EL element in electroluminescence devices (it is indicated as an EL element below). Generally an organic EL element has the advantage that an inorganic EL element emits light by high brightness to a thin film type and distributed type emitting light by alternating voltage dozens ofv or more by the direct current voltage about 10V or not more than it. The general structure of an organic EL element is shown in the cross section of drawing 9 .
[0003] It has the structure which carries out the laminating of a transparent electrode 12, the organic luminous layer 15, and the counterelectrode 16 to order on the transparent substrate 11. the layered product of the electron-injection layer which consists of a layered product, or such a luminous layer and the perylene derivative of the luminous layer which consists of an organic solid-state of the fluorescence nature of a hole-injection layer and an anthracene which is a layered product of various organic thin films, for example, consists of a triphenylamine derivative etc. although the organic luminous layer 15 is not shown in drawing 9 -- moreover -- or combination, such as a layered product of these hole-injection layers, luminous layers, and electron-injection layers, can be chosen
[0004] An electron hole and an electron are poured into the organic luminous layer 15 by impressing voltage to a transparent electrode 12 and a counterelectrode 16, these recombine, the energy produced by reunion excites a fluorescent substance, and luminescence of an organic EL element starts it by the mechanism in which light is emitted, when the excited fluorescent substance returns to a ground state. A mechanism called intermediate reunion is the same as that of common diode, and current and luminescence intensity show the strong nonlinearity accompanied by a rectifying action to applied voltage so that it may be expected also from this. As a typical example of a property, the voltage dependency of luminescence intensity is shown in drawing 8 . Although the numeric value is omitted here, it is threshold VT in such an organic EL element. Generally it is several V.
[0005] In an organic EL element, in order to take out luminescence by the organic luminous layer 15, one electrode must be transparent, usually, forms a transparent electrode 12 by the transparent conductor of indium oxide tin (ITO), and makes this an anode plate. It is important to use the small matter of a work function at cathode for making an electron injection easy and on the other hand, gathering luminous efficiency, and, generally it uses Mg-Ag and the metal membrane of aluminum-Li as a counterelectrode 16.
[0006] One feature of the organic EL element using a metal membrane as a counterelectrode 16 is visible to a perfect mirror plane, when this element is seen from a transparent substrate side at the time of un-emitting light. Organic luminous layer 15 thickness is optical nearly completely eye a transparent hatchet thinly with about 10nm, and this can have a directly seen counterelectrode.
[0007] Means of displaying can be divided roughly into two like [an organic EL element] many other display devices. That is, it is with the so-called segmental-die display which it divides [display] into two or more pixels of a specific configuration, and carries out selection luminescence of the some, and the so-called matrix type display which allots the pixel of the same configuration in the shape of a matrix (lengthwise is a train and a longitudinal direction is a line), is made to carry out selection luminescence of the some, and expresses an arbitrary configuration.
[0008]
[Problem(s) to be Solved by the Invention] When using an organic EL element by segmental-die display, as a problem which becomes remarkable especially, there is dispersion in the luminescence intensity between pixels. this -- the graph of drawing 8 -- it is because small property-dispersion which originates in the nonlinearity of the luminescence intensity of an organic EL element [like], and was produced between each pixel serves as a big luminescence on-the-strength difference
[0009] Furthermore, when it miniaturizes a display using an organic EL element by segmental-die display, there is unnecessary luminescence of those other than the pixel section as another problem which becomes remarkable especially. Although the field of wiring by the transparent electrode 12 to each pixel electrode is required of a segmental-die display, if the display is miniaturized, it will be hard coming to avoid laps, such as intersection with the transparent electrode 12 in the increase of a ratio, and this wiring field and counterelectrode 16 on the transparent substrate 11 of the field. Then, although

the organic luminous layer 15 will be formed in the portion which a wiring electrode and a counterelectrode face up and down between them at this intersection etc. and a short circuit will be prevented, unnecessary luminescence in this lap portion will be induced as the result.

[0010] On the other hand, it is high-definition, and a matrix display is indispensable in order to attain a supple display. However, in an organic EL element, difficulty is about the matrix of a detailed pixel from the restrictions on the production to acquire a display object.

[0011] The purpose of this invention also solves simultaneously the problem which is to attain [being in solving the above-mentioned technical problem and acquiring the organic EL-element structure and the drive method of good display quality, especially suppressing dispersion in the luminescence intensity between remarkable pixels, and unnecessary luminescence of those other than the pixel section by the organic EL element of a segmental-die display, and] the matrix type display of a detailed pixel, especially is common in a segmental-die display in the latter.

[0012]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the organic EL element of this invention is characterized by a product with the resistance of the wiring electrode linked to the area of a pixel electrode and this being ******** in the organic electroluminescence element which consists of a transparent electrode which carries out functional separation, and which is formed on a transparent substrate at a pixel electrode and a wiring electrode, and the organic luminous layer formed one by one on a pixel electrode and a counterelectrode. Moreover, it is characterized by controlling the resistance of a wiring electrode by the pattern configuration of a wiring electrode here.

[0013] In the organic electroluminescence element which consists of the pixel electrode and wiring electrode which form the organic EL element of this invention on a transparent substrate, and the organic luminous layer formed one by one on a pixel electrode and a counterelectrode, a wiring electrode is characterized by the bird clapper from the composite electrode of a metal electrode or a transparent electrode, and a metal electrode.

[0014] The organic EL element of this invention is characterized by an insulator layer and an organic luminous layer carrying out laminating formation between them at the portion which a wiring electrode and a counterelectrode face up and down in the organic electroluminescence element which consists of the pixel electrode and wiring electrode which are formed on a transparent substrate, and the organic luminous layer formed one by one on a pixel electrode and a counterelectrode. And a wiring electrode's being either of the composite electrodes of a transparent electrode, a metal electrode or a transparent electrode, and a metal electrode and an insulator layer consider as an inorganic oxide, an inorganic nitride, or a high molecular compound.

[0015] The organic EL element of this invention is characterized by arranging a pixel electrode in the shape of a matrix, and for the pixel electrode of the direction of a train connecting regularly by the wiring electrode, and a counterelectrode forming for every pixel electrode of N adjoining lines. And every 1/N regular variation rate of that two pixel electrodes located in a boundary with the counterelectrode which belongs and adjoins the same train form the transparent electrode of one, and the width of face of a pixel electrode is repeated in a line writing direction here.

[0016] The drive method of the organic EL element of this invention is characterized by for the voltage pulse impressed to a wiring electrode in the organic electroluminescence element which consists of an organic luminous layer formed between the pixel electrode formed in the shape of a matrix on a transparent substrate, the wiring electrode which connects each pixel electrode in the direction of a train regularly, the counterelectrode formed corresponding to the pixel electrode of a line writing direction, and a pixel electrode and a counterelectrode to be the polarity which conflicts in the time of selection and un-choosing. Moreover, it carries out [absolute value / of an opposite polar voltage pulse].

[0017] The organic EL element of this invention abolishes dispersion in the amount of voltage drops in a wiring electrode. That is, when it is going to make a specific pixel emit light, the current which flows as a load is proportional to the area of the pixel electrode mostly. On the other hand, the size of the voltage drop in a wiring electrode serves as a product of wiring resistance and the flowing current. Therefore, by seting constant the area of a pixel electrode, and the product of the resistance of a wiring electrode, dispersion in the amount of voltage drops in a wiring electrode can be abolished, and nonlinearity can suppress dispersion in the luminescence intensity for every segment pixel also in a strong organic EL element to the minimum.

[0018] Moreover, the organic EL element of this invention makes a wiring electrode the composite electrode of a metal electrode or an opaque metal electrode, and an opaque transparent electrode. It is made for luminescence in this portion not to leak to the deer screen only by this. Furthermore, more certainly, by the intersection which faces up and down, a wiring electrode and a counterelectrode carry out the laminating of an insulator layer and the organic luminous layer, and prepare them in the meantime. The voltage actually built over an organic luminous layer by existence of an insulator layer in an intersection etc. though voltage will be impressed between a wiring electrode and a counterelectrode, if it does in this way becomes small. For this reason, luminescence by the intersection [an intersection] to make it emitting light originally can be completely suppressed according to the effect of the nonlinearity of an organic EL element.

[0019] the drive method of the organic EL element of this invention drives two or more lines simultaneously in a matrix type display -- as -- carrying out -- the width of face in the direction of a train of one counterelectrode -- a pixel -- a ratio -- **** expansion is carried out Consequently, a detailed matrix can be formed also by the difficult counterelectrode of detailed-izing. Moreover, about the problem of unnecessary luminescence in the same wiring electrode section, it solves with the same means as the above-mentioned with the segmental-die display derived when it does in this way having described.

[0020] Moreover, in a matrix type display, by making the voltage pulse which is impressed by the wiring electrode and turns

into a data pulse into the polarity which conflicts in the time of selection and un-choosing, the charge storage in an organic luminous layer is suppressed, and the reinforcement of an organic EL element is measured.
[0021]
[Embodiments of the Invention] Hereafter, the example of this invention is explained using a drawing. Drawing 1 is the plan showing the organic EL element of the 1st example by this invention. Only the transparent substrate 11 and a transparent electrode 12 are shown among the components of the organic EL element in drawing 9 for brief-izing of explanation. As an organic EL element, an organic luminous layer and a counterelectrode are formed further and it completes.
[0022] As shown in drawing 1 , a transparent electrode 12 is formed in the transparent substrate 11 by etching processing of a transparent electric conduction film as the pattern which carried out functional separation the pixel electrodea [13] and 13b, ..., wiring electrodes 14a and 14b and ... And luminescence of the selected pixel is performed to the pixel electrode which impressed voltage and was chosen as the wiring electrode corresponding to a pixel by passing current.
[0023] The feature of the organic EL element by this invention shown in drawing 1 is to make a product with each pixel electrodes 13a and 13b, the wiring electrodes 14a and 14b linked to the area and each pixel electrode of ..., and the resistance of ... into a certain constant value. This is making the product of the product of the area of pixel electrode 13a, and the resistance of wiring electrode 14a or the area of pixel electrode 13b, and the resistance of wiring electrode 14b into constant value. In this case, since the area of a pixel electrode becomes settled almost uniquely with the use and specification of a display, the resistance of a wiring electrode is controlled according to this. The simple and effective means of such resistance control is designing the configuration of a wiring electrode individually and carrying out patterning by etching, as shown in drawing 1 .
[0024] Next, it is a book. the transparent electrode 12 formed by ITO -- a metal electrode -- ratios -- **** -- specific resistance -- it is large and resistance becomes large especially in the portion of the wiring electrode 13 used as narrow leading about For this reason, when luminescence of the pixel which impressed and chose a certain voltage tends to be carried out, the voltage drop in the wiring electrode section by the flowing current starts a wiring electrode, and it becomes the effective voltage built over an organic luminous layer in the pixel electrode section of the segment which the value which deducted a part for this voltage drop from supply voltage chose. In an organic EL element, this amount of voltage drops usually becomes dozens - 100mV of numbers.
[0025] On the other hand, the luminescence intensity of an organic EL element shows strong nonlinearity to applied voltage, as shown in the graph of drawing 8 . For this reason, when such amounts of voltage drops differ for every pixel, big dispersion is produced about the luminescence intensity between pixels.
[0026] this invention abolishes dispersion in the amount of voltage drops in a wiring electrode, and prevents dispersion in the luminescence intensity between pixels. That is, when the pixel of a specific segment is made to emit light, the current which flows as a load is proportional to the area of the pixel electrode mostly. On the other hand, the size of the voltage drop in a wiring electrode serves as a product of wiring resistance and the flowing current. Therefore, if the area of a pixel electrode and the product of the resistance of a wiring electrode are set constant, the amount of voltage drops will become fixed. Consequently, nonlinearity can suppress dispersion in the luminescence intensity for every pixel also in a strong organic EL element to the minimum like drawing 8 .
[0027] The 2nd example of this invention is explained below. Drawing 2 is the plan showing organic [of the 2nd example of this invention / EL], and is made the same [the transparent substrate 11 and a transparent electrode 12] as that of drawing 1 . In addition, although there is an independence in invention of drawing 2 , and invention of drawing 1 mutually, a more nearly quality display is obtained with the combination. Now, in drawing 2 , the insulator layer 17 formed so that a part of transparent substrate 11 and wiring electrode 14 may be covered, an organic luminous layer (not shown for simplification of a drawing), and a counterelectrode 16 are formed further in piles one by one. Not forming an insulator layer 17 in the portion of the pixel electrode 13 and forming an organic luminous layer and a counterelectrode 16 in this portion require cautions here. Furthermore, an insulator layer 17 and an organic luminous layer are that the wiring electrode 14 and a counterelectrode 16 surely form in both sides at the portion which faces up and down. Under the present circumstances, there is no constraint about the vertical relation between an insulator layer 17 and an organic luminous layer, and these are formed between the wiring electrode 14 and a counterelectrode 16.
[0028] Drawing 3 is the cross section showing the cross section in the A-B line of drawing 2 . Drawing 3 shows still more clearly the formation situation of each class in each field.
[0029] Book That is, in the portion in which an insulator layer 17 and an organic luminous layer carry out a laminating and which they prepare, the voltage actually built over an organic luminous layer by existence of an insulator layer 17 though voltage is impressed between the wiring electrode 14 and a counterelectrode 16 becomes small, and does not emit light at all for the nonlinearity of the organic EL element of drawing 8 .
[0030] In this invention, there is a big advantage that integrity is not necessarily required of the property as a film of an insulator layer 17, i.e., an insulating property. Even if the reason has a pinhole defect in an insulator layer 17, current is restricted by the organic luminous layer, and it can prevent, and since the luminescence intensity in a pinhole portion is moreover also minute area, a short circuit is feeble and can be disregarded.
[0031] By the way, it is [that what is necessary is likely to be just to prepare the outgoing line from a counterelectrode 16 so that a counterelectrode 16 may be formed only in the portion of the pixel electrode 13 and the wiring electrode 14 may not be intersected as a means to prevent this unnecessary luminescence] visible. However, the space which pulls out a counterelectrode 16 will almost be lost, without having to stop having to assign the surrounding narrow field of the pixel

electrode 13 to the wiring electrode 14, and intersecting the wiring electrode 14, if the display pattern is miniaturized.
[0032] And although a counterelectrode 16 is the metal membrane of Mg-Ag with difficult etching, and aluminum-Li, vacuum evaporationo is carried out and pattern formation is carried out using a mask, it is difficult to make the small pixel electrode 13 correspond and to form a pattern itself. furthermore, the case where a counterelectrode 14 will be connected with narrow wiring, considered as the big common electrode, and it forms -- ratios -- **** -- resistance -- it goes up and the same problem as the argument by the wiring electrode of drawing 1 occurs Furthermore, although the portion of the counterelectrode which is a metal is visible to a mirror plane in an organic EL element as mentioned above, if a counterelectrode 16 is formed only in the pixel electrode section, when the whole screen at the time of un-emitting light is seen, it will become the unnatural thing which is dotted with a small mirror plane. Therefore, prevention of the above-mentioned unnecessary luminescence by local formation of a counterelectrode 16 is not realistic.
[0033] In addition, a wiring electrode is formed by the film which intercepts light instead of forming an insulator layer, when some imperfection is permitted and suppression of this unnecessary luminescence is considered. For example, it is effective to consider as a metaled wiring electrode or to form the wiring electrode which carried out the laminating of a metal electrode and the transparent electrode. In this case, that the leakage light from the edge of a wiring electrode must be permitted is the origin called some imperfection. In addition, as a metal which constitutes an electrode, aluminum, chromium, nickel metallurgy (Au), or these charges of an alloy are selectable.
[0034] The creation method of the organic EL element of this invention shown in drawing 2 and drawing 3 is described below. If it states generally, the laminating of a transparent electrode 12, an insulator layer 17, the organic luminous layer 15, and the counterelectrode 16 will be carried out to the upper surface of the transparent substrate 11 of an alkali free glass with a thickness of 0.3mm one by one. Hereafter, it states to a detail more.
[0035] A transparent electrode 12 **********s and forms [at the thickness of 100nm] ITO which carries out film formation by the sputtering method on the transparent substrate 11 the predetermined pattern of the pixel electrode 13 and the wiring electrode 14. At this time, as explanation of drawing 1 described, the wiring electrode 14 is designed to a pattern with which a product with the resistance of the wiring electrode linked to the area of a pixel electrode and it serves as constant value. In addition, sheet resistance of an ITO film is 10ohm/**.
[0036] A silicon nitride film with a thickness of 30nm is formed in the field it is indicated to drawing 2 that next covers the wiring electrode 14 by the chemical-vacuum-deposition (CVD) method. At this time, the photosensitive resist film is prepared in the portion which does not form the insulator layers 17, such as the pixel electrode section, a silicon nitride film is formed on it, and an insulator layer 17 is formed only in a required field by the so-called lift-off method for finally removing the photosensitive resist film.
[0037] the next -- the hole-injection layer of 60nm of thickness -- here -- a triphenylamine derivative -- vacuum evaporationo -- carrying out -- a hole-injection layer top -- a luminous layer with a thickness of 60nm -- the vacuum evaporationo of the aluminum chelate complex is carried out here, and the organic luminous layer of 120nm of thickness is formed in total Here, a mask is used at the time of vacuum evaporationo, and the organic luminous layer 15 is formed so that both an insulator layer 17 and the pixel electrode 13 may be covered. further -- the organic luminous layer 15 top -- the counterelectrode 19 with a thickness of 150nm -- here, the vacuum evaporationo of Mg-Ag is too carried out using a mask, and an organic EL element is completed
[0038] When voltage was impressed to the organic EL element of the segmental-die display by this invention formed the above condition and how many kinds of those character representation were performed, the luminescence intensity between the pixels of each segment was uniform, and the beautiful display without unnecessary luminescence of those other than the pixel section was obtained.
[0039] In the organic EL element of the example of this invention, although the silicon nitride was used as an insulator layer, you may use a silicon oxide and the inorganic oxide of an aluminum oxide in addition to this inorganic nitride. Furthermore, you may use the organic substance, especially a high molecular compound. For example, in the case of a high molecular compound like a polyimide, according to the method of dissolving and applying to a solution and making a solvent evaporating, print processes can be used, and since partial formation of an insulator layer is easy, it is effective.
[0040] The 3rd example is explained below. Drawing 4 is the plan showing organic [of the 3rd example of this invention / EL], and shows the pattern formed on the transparent substrate (not shown). In this case, the pixel electrodes 13a, 13b, and 13c and ... are regularly located in a line, and it has become a matrix type display. The 1st point of an important thing is that groups on a par with the same train, such as two pixel electrodes 13a and 13b or 13c and 13d, have the counterelectrodes 16a and 16b prolonged in a line writing direction, respectively in this invention. The greatest meaning of this is enlarging-relatively-pattern of counterelectrode 16 ****. That is, it is the metal membrane of Mg-Ag with difficult etching, and aluminum-Li, the vacuum evaporationo of the counterelectrode 16 is carried out using a mask, and in order to carry out pattern formation, difficulty is to form a fine pattern, as mentioned above. On the other hand, by matrix type display, as for a pixel electrode, it is desirable to make it as small as possible, by the matrix display which makes a stripe cross simply, the width of face of the stripe of a counterelectrode turns into width of face of a pixel mostly, and it becomes difficult [the formation] very much [it]. On the other hand, in arrangement of this invention, width of face of a stripe is made to double precision, and this difficulty can be eased sharply.
[0041] a multiplex matrix [in / a liquid crystal display / in this arrangement] -- ideological -- common -- a liquid crystal display -- the same -- the selection time per pixel -- being long (double precision in this case) -- the instantaneous-carrying-current value for obtaining fixed brightness can be reduced (1/2 / in this case /), and it is advantageous

also in respect of the load of a circuit and an element
[0042] As this invention already explained the 2nd important point in the segmental-die display, it is forming an insulator layer 17 in the wiring electrodes 14a and 14b and the portion of .. This effect is completely the same as that of having explained in drawing 2 . Although it does not have a thing corresponding to the wiring electrode 14, either (a pixel electrode serves as a wiring electrode) and does not have the need for such an insulator layer when a matrix type display also makes a stripe cross simply, with the composition of drawing 4 of this invention, unnecessary luminescence by the wiring electrode poses a problem like drawing 2 .
[0043] The drive method of this invention is explained below. Drawing 5 shows the wave which drives the organic EL element of this invention, a horizontal axis is time and a vertical axis is voltage. The timing pulse of the time-sharing drive which impresses three [upper] to the stripe-like counterelectrodes 16a, 16b, and 16c, the data pulse which impresses the following two to the wiring electrodes 14a and 14b synchronizing with this timing pulse, and the following six are voltage impressed to an organic luminous layer in the pixel electrodes 13a, 13b, and 13c and ... by composition of these timing pulses and a data pulse.
[0044] Here, it is the voltage of V1 and the data pulse at the time of luminescence selection of a pixel about the voltage of a timing pulse. - It is it at the time of V2 and luminescence un-choosing V2 It carries out. And it is V1 =2V2 in order to improve a prospect more. Although carried out, when are done in this way and a timing pulse and a select data pulse are in agreement, at the time of V1+V2 and others, it is V2. Or the voltage of -V2 will be impressed by each pixel. Threshold VT of the organic EL element shown by drawing 8 here It receives and they are V1+V2 >VT and V2 <VT. It is V1 and V2 so that it may become. Setting up is V1+V2 which was easy and performed hatching in the case of drawing 5 . Light is emitted to the timing to which the pixel to which voltage corresponds only when [to each pixel] impressed corresponds.
[0045] Although a data pulse carries out dependence to the content of data in an organic matrix type EL-element display according to the drive method of this invention, it is alternating-current-ized in false. Consequently, when direct current voltage is impressed for a long period of time, the charge-storage phenomenon in the organic luminous layer which poses a problem can be suppressed, and decline in the luminous efficiency of an element and short period-ization of an element life can be improved.
[0046] moreover, the case where a data pulse is performed by the unipolar pulse when it is going to make regularity difference of the applied voltage to the pixel in the time of selection and un-choosing -- ratios -- ****, by the bipolar pulse of this invention, the absolute value of voltage is made to one half In addition, at drawing 5 , it is V1 =2V2. These two are not an indispensable condition, although it carried out and the absolute value of the data pulse in the time of selection and un-choosing was made the same. The voltage of the composite pulse of a timing pulse and a select data pulse is VT. It is fully large and each of voltage of the composite pulse of a timing pulse and a non-select data pulse and non-select data pulse itself are VT. A small thing is an indispensable condition.
[0047] Drawing 6 is the plan showing the organic EL element of the 4th example of this invention. Although it is a matrix type like drawing 4 , it is having changed the important point to the wiring electrode by this invention, and having used the low metal wiring electrode 64 of resistance, and allotting three pixel electrodes 13a, 13b, and 13c in the direction of a train to counterelectrode 16b, in order to make large more width of face of Counterelectrodes 16a and 16b and the stripe of ..
[0048] Furthermore, by this invention, the pixel electrodes 13a and 13c driven by counterelectrode 16b serve also as the pixel electrode driven by the next counterelectrodes 16a and 16c, respectively, and are characterized by being the unified longwise transparent electrode. If it does in this way, in case the vacuum evaporationo of the stripe-like counterelectrode will be carried out using a mask, it becomes possible to loosen the precision of the alignment of a mask, and becomes a big advantage on manufacture.
[0049] Thus, according to this invention, to the same pixel electrode size, the pattern of a counterelectrode can be enlarged more and the precision of positioning of the counterelectrode to the position of a pixel electrode can be eased. Furthermore, when considering as the same wiring resistance by considering as a metal wiring electrode, wiring width of face can be made thinner than a transparent electrode, and the rate of the pixel polar zone to the whole screen can be improved. In addition, it is possible to exclude this as drawing 2 and drawing 4 described the insulator layer 17.
[0050] Drawing 7 is the plan showing the organic EL element of the 5th example of this invention, and realized high-density pixel arrangement by making the line writing direction instead of a single tier shift the pixel arrangement in drawing 6 in the direction of a train with a fixed phase. This shift amount is 1/3 of the width of face of the pixel electrode 13, and this denominator serves as line count of the pixel electrode belonging to one counterelectrode. According to this invention, all the advantages stated by drawing 6 correspond, and, moreover, can improve further the rate of the pixel polar zone to the whole screen. In addition, although the insulator layer is not used in this invention, it is because luminescence in this portion does not necessarily need to form an insulator layer since it prevents opaque metal wiring electrode 64 itself leaking to the screen as drawing 2 already explained this to some extent. In addition, since it cannot be prevented, when asking for a more nearly high-definition display, formation of an insulator layer is required for the leakage light from the edge of the metal wiring electrode 64 like drawing 6 .
[0051]
[Effect of the Invention] As explained above, according to the organic EL element of this invention, the segmental-die display without dispersion in the luminescence intensity between segments is obtained. Furthermore, according to the organic EL element of this invention, the quality display without unnecessary luminescence of those other than the pixel section which can attain a high-density matrix type display, and poses a problem by the matrix type display of a segmental die and a part can

be obtained. Furthermore, according to the drive method of the organic EL element of this invention, the reinforcement of an organic EL element is realizable.

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CLAIMS

[Claim(s)]
[Claim 1] The organic electroluminescence element characterized by a product with the resistance of the wiring electrode linked to the area of a pixel electrode and this pixel electrode being about 1 constant value in the organic electroluminescence element which consists of a transparent electrode which carries out functional separation, and which is formed on a transparent substrate at a pixel electrode and a wiring electrode, and the organic luminous layer formed one by one on a pixel electrode and a counterelectrode.
[Claim 2] The organic electroluminescence element according to claim 1 characterized by the resistance of a wiring electrode controlling by the pattern configuration of a ****** electrode.
[Claim 3] It is the organic electroluminescence element to which a wiring electrode is characterized by the bird clapper from the composite electrode of a metal electrode or a transparent electrode, and a metal electrode in the organic electroluminescence element which consists of the pixel electrode and wiring electrode which are formed on a transparent substrate, and the organic luminous layer formed one by one on a pixel electrode and a counterelectrode.
[Claim 4] The organic electroluminescence element characterized by an insulator layer and an organic luminous layer carrying out laminating formation between the wiring electrode and counterelectrode into the portion by which a wiring electrode and a counterelectrode face the bottom of ** in the organic electroluminescence element which consists of the pixel electrode and wiring electrode which are formed on a transparent substrate, and the organic luminous layer formed one by one on a pixel electrode and a counterelectrode.
[Claim 5] A wiring electrode is an organic electroluminescence element according to claim 4 characterized by being either of the composite electrodes of a transparent electrode, a metal electrode or a transparent electrode, and a metal electrode.
[Claim 6] A pixel electrode is the claims 3 and 4 characterized by arranging in the shape of a matrix, and for the pixel electrode of the direction of a train connecting regularly by the wiring electrode, and forming a counterelectrode for every pixel electrode of N adjoining lines, or an organic electroluminescence element given in 5.
[Claim 7] The pixel electrode belonging to the same train is an organic electroluminescence element according to claim 6 characterized by two pixel electrodes located in a boundary with the adjoining counterelectrode forming the transparent electrode of one.
[Claim 8] The organic electroluminescence element according to claim 6 characterized by repeating every 1/N regular variation rate of the width of face of a pixel electrode in a line writing direction.
[Claim 9] An insulator layer is the claim 4 characterized by being an inorganic oxide or an inorganic nitride, or an organic electroluminescence element given in 5.
[Claim 10] The claim 4 characterized by an insulator layer being a high molecular compound, or an organic electroluminescence element given in 5.
[Claim 11] The voltage pulse which is characterized by providing the following and which is impressed to a wiring electrode in the drive method of an organic electroluminescence element is the drive method of the organic electroluminescence element characterized by being the polarity which conflicts in the time of selection and un-choosing. The pixel electrode formed in the shape of a matrix on a transparent substrate. The wiring electrode which connects each pixel electrode in the direction of a train regularly. The counterelectrode formed corresponding to the pixel electrode of a line writing direction. The organic luminous layer formed between a pixel electrode and a counterelectrode.
[Claim 12] The absolute value of an opposite polar voltage pulse is the drive method of the organic electroluminescence element according to claim 11 characterized by the equal thing.

[Translation done.]

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the plan showing the structure of the organic EL element by the 1st example of this invention.
[Drawing 2] It is the plan showing the structure of the organic EL element by the 2nd example of this invention.
[Drawing 3] It is the cross section showing the structure of the organic EL element by the 2nd example of this invention.
[Drawing 4] It is the plan showing the structure of the organic EL element by the 3rd example of this invention.
[Drawing 5] It is the wave form chart showing the drive wave of the organic EL element by this invention.
[Drawing 6] It is the plan showing the structure of the organic EL element by the 4th example of this invention.
[Drawing 7] It is the plan showing the structure of the organic EL element by the 5th example of this invention.
[Drawing 8] It is the graph which shows the relation between the voltage of an organic EL element, and luminescence intensity.
[Drawing 9] It is the cross section showing the structure of the organic EL element in the conventional technology.
[Description of Notations]
11 Transparent Substrate
12 Transparent Electrode
13 Pixel Electrode
14 Wiring Electrode
15 Organic Luminous Layer
16 Counterelectrode
64 Metal Wiring Electrode

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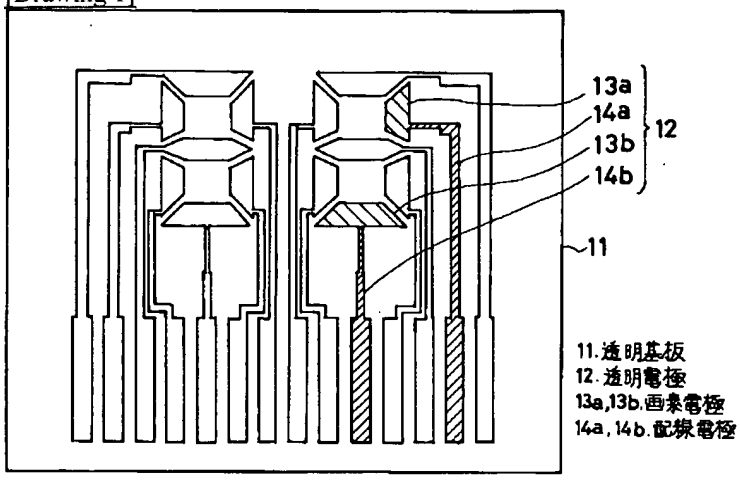
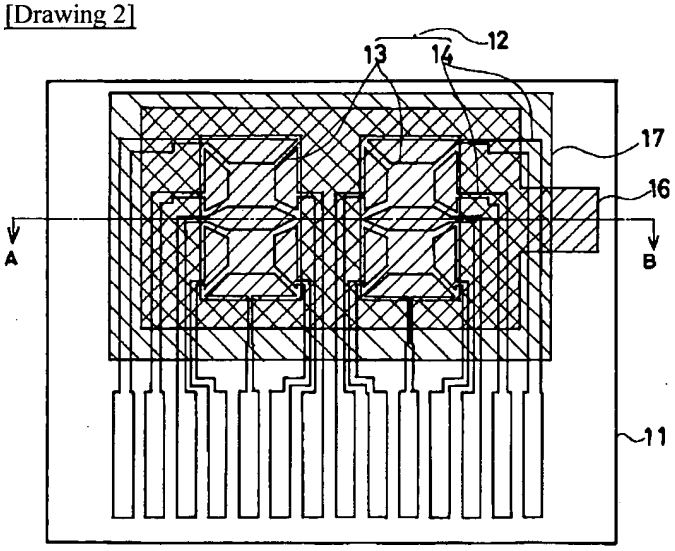
DRAWINGS

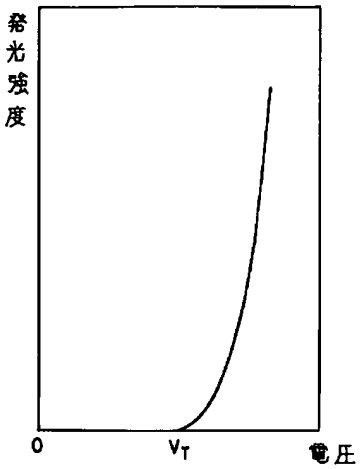
[Drawing 1]



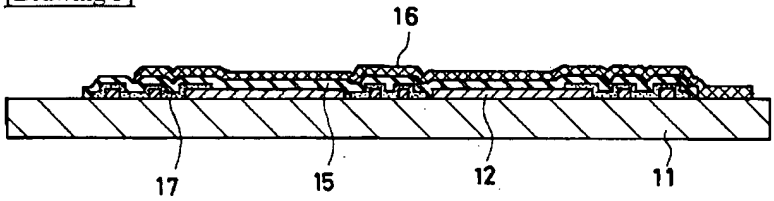
[Drawing 2]



[Drawing 8]



[Drawing 3]



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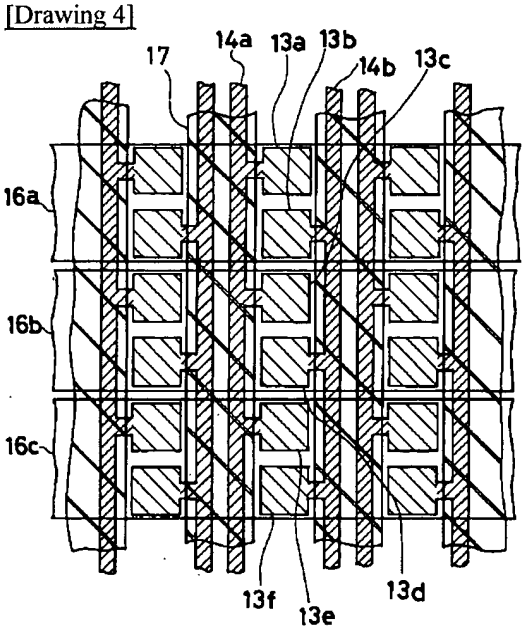
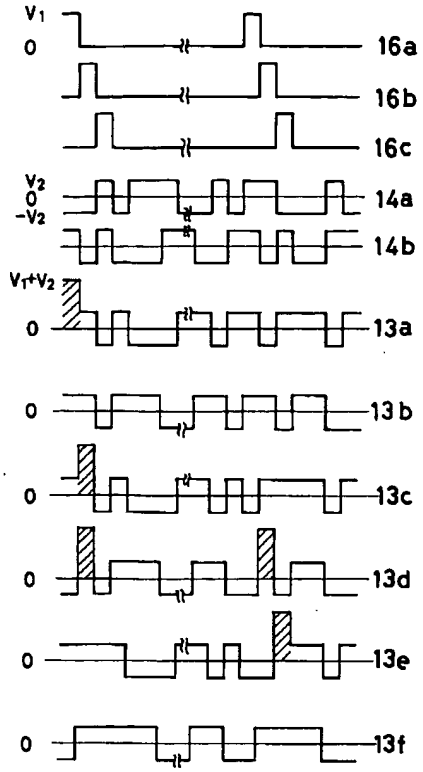


[Drawing 5]



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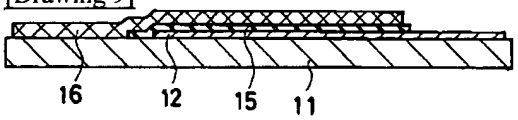
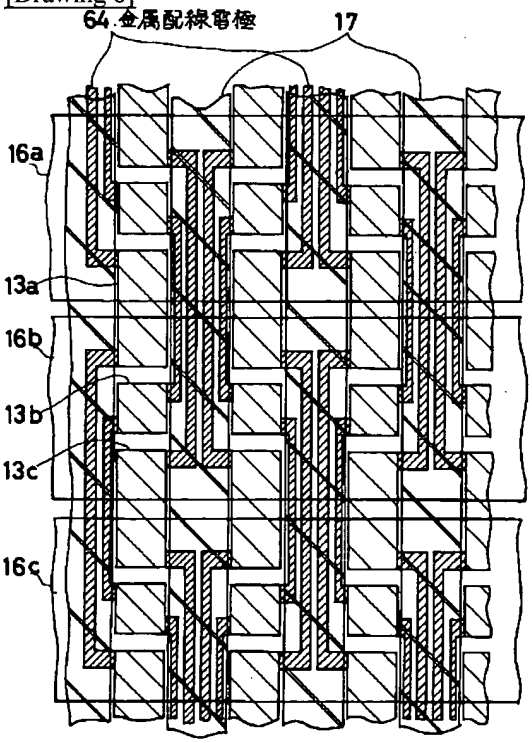
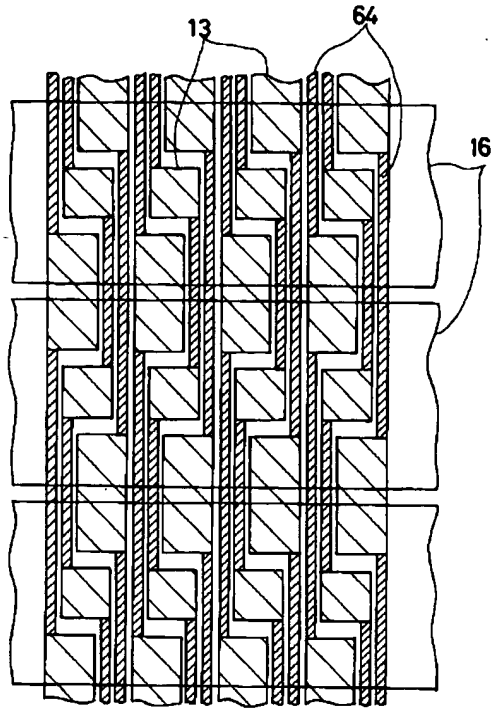


[Drawing 6]



[Drawing 7]



[Translation done.]